

WHAT IS CLAIMED IS:

- 1 *Sub 17* 1. An impairment compensation sequence for use in a communications
2 system, the communications system susceptible to one or more potential impairments
3 each periodic in an integer number of symbols transmitted across a communications
4 channel, the impairment compensation sequence comprising:
5 N phases, wherein N is selected such that each potential impairment, if
6 present, is periodic therein; and
7 a sequence of symbols, the sequence organized to place at least one instance of
8 each symbol from a predetermined set of symbols in each phase to
9 allow detection of the potential impairments in each of the N phases.
- 1 2. The impairment compensation sequence of claim 1 wherein the potential
2 impairments include at least one of robbed-bit signaling, padding and a combination
3 of robbed-bit signaling and padding.
- 1 3. The impairment compensation sequence of claim 1 wherein the sequence
2 includes a number of segments, the number corresponding to a number of elements in
3 the predetermined set of symbols.
- 1 4. The impairment compensation sequence of claim 1 wherein the
2 predetermined set of symbols are chosen from at least a subset of a universal pulse
3 code modulation (PCM) codeword set.
- 1 5. The impairment compensation sequence of claim 4 wherein the subset is
2 selected in accordance with power constraints.
- 1 6. The impairment compensation sequence of claim 1 wherein the N phases
2 include 24 time phases.
- 1 7. The impairment compensation sequence of claim 1 wherein N is a least
2 common multiple of respective periods of each of the potential impairments.

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12. The communications system of claim 10 wherein the potential impairments include at least one of robbed-bit signaling, padding and a combination of robbed-bit signaling and padding.

1 13. The communications system of claim 10 wherein the predetermined set of
2 symbols includes at least a subset of a universal pulse code modulation (PCM)
3 codeword set.

1 14. The communications system of claim 10 wherein the N phases include 24
2 time phases.

1 15. The communications system of claim 10 wherein N is a least common
2 multiple of respective periods of each of the potential impairments.

1 16. The communications system of claim 10 wherein the sequence is
2 organized to place at least two instances of the symbol from the predetermined set of
3 symbols in each phase, an average of received values corresponding to the at least two
4 improving an estimation of the symbol.

1 17. A receiver for receiving data over a communications channel susceptible
2 to one or more potential impairments each periodic in an integer number of symbols
3 transmitted across a communications channel, the receiver comprising:
4 a demodulator for demodulating a modulated impairment compensation
5 sequence, the impairment compensation sequence including:
6 N phases, wherein N is selected such that each potential impairment, if
7 present, is periodic therein; and
8 a sequence of amplitudes transmitted from terminal equipment, the
9 sequence organized to place at least one instance of each
10 symbol from a predetermined set of symbols in each phase to
11 allow detection of the potential impairments in each of the N
12 phases; and
13 a decoder for decoding the sequence of amplitudes.

1 18. A method of establishing communication across a channel, the
2 communication susceptible to one or more potential impairments each periodic in an
3 integer number of symbols, the method comprising:

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receiving a sequence of symbols, the sequence organized to place at least one instance of each symbol from a predetermined set of symbols in each of N phases, wherein N is selected such that each potential impairment, if present, is periodic therein; and detecting potential impairments, if present, corresponding to each of the N phases.

19. The method of claim 18, wherein the channel includes a digital portion of a Public Switched Telecommunications Network (PSTN) and wherein the potential impairments include at least one of robbed-bit signaling (RBS), padding, and a combination of robbed-bit signaling and padding in the digital portion of the PSTN.

20. The method recited in claim 18 wherein the sequence of symbols is a digital impairment learning (DIL) sequence.

21. The method recited in claim 18 wherein N is a least common multiple of respective periods of each of the potential impairments.

22. The method recited in claim 18 wherein the sequence of symbols is organized to place at least two instances of the symbol from the predetermined set of symbols in each phase, an average of received values corresponding to the at least two instances improving an estimation of the symbol.

23. The method recited in claim 18 wherein the sequence of symbols includes a number of segments, the number corresponding to a number of elements in the predetermined set of symbols.

24. The method recited in claim 18 wherein the predetermined set of symbols are chosen from at least a subset of a universal pulse code modulation (PCM) codeword set.

25. The method recited in claim 24 wherein the subset is selected in accordance with power constraints.

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1 26. The method recited in claim 18 wherein the sequence of symbols is a
2 digital impairment learning (DIL) sequence.

1 27. The method recited in claim 18 wherein the sequence of symbols is
2 compatible with a plurality of equalizers, the plurality of equalizers including partial
3 response type equalizer structures.

1 28. A computer program product comprising:
2 instructions executable on at least one processor to at least partially implement
3 a communications device; and
4 said instructions including a communication subset thereof executable to adapt
5 the communications device to establish communication across a
6 channel susceptible to one or more potential impairments each periodic
7 in an integer number of symbols transmitted across the channel, the
8 communications device for receiving an impairment compensation
9 sequence, the impairment compensation sequence including:
10 N phases, wherein N is selected such that each potential impairment, if
11 present, is periodic therein; and
12 a sequence of amplitudes transmitted from terminal equipment, the
13 sequence organized to place at least one instance of each
14 symbol from a predetermined set of symbols in each phase to
15 allow detection of the potential impairments in each of the N
16 phases.

1 29. A computer program product as in claim 28 wherein the instructions are
2 encoded by or transmitted in at least one computer readable medium selected from the
3 set of a disk, tape or other magnetic, optical, or electronic storage medium and a
4 network, wireline, wireless or other communications medium.

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